

REMARKS

In the outstanding Office Action, the Examiner: (1) rejected claims 1, 3, 4, 7, and 9 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,662,260 to Wertheim et al. in view of U.S. Patent No. 6,467,003 to Doerenberg et al.; (2) rejected claim 5 under 35 U.S.C. §103(a) as being unpatentable over Wertheim and Doerenberg in further view of U.S. Patent Application No. 2004/0128413 to Chelsea et al.; (3) rejected claims 2 and 6 under 35 U.S.C. §103(a) as being unpatentable over Wertheim in view of U.S. Patent No. 5,630,145 to Chen and in further view of U.S. Patent Application No. 2001/0003206 to Pole II, et al.; (4) rejected claim 8 under 35 U.S.C. §103(a) as being unpatentable over Wertheim and Doerenberg in further view of U.S. Patent Application No. 2001/0008550 to Takahashi; and (5) rejected claims 10 and 11 under 35 U.S.C. §103(a) as being unpatentable over Wertheim and Doerenberg in further view of U.S. Patent No. 6,079,024 to Hadjimohammadi.

In the outstanding Office Action, the Examiner also made remarks concerning priority. The original transmittal form and the declaration, both filed on 12 December 2003 along with the specification, drawings, and claims herein, claimed priority to P.C.T. application number PCT/FI02/00497, filed on 7 June 2002, and to Finnish patent application number 20011257, filed on 13 June 2001. Therefore, priority was claimed within the time period set forth in 37 C.F.R. 1.78(a). The present amendment also amends the specification to claim priority to the P.C.T. and Finnish applications.

The Examiner further had questions about certified copies for foreign priority. Enclosed herewith is the certified copy of the Finnish application number 20011257, filed on 13 June 2001. The Examiner also requested a "certified copy" of the P.C.T. application PCT/FI02/00497, filed on 7 June 2002. The P.C.T. application has been communicated to the USPTO under Rule 47.1(c) (see M.P.E.P., Appendix T, Rule 47.1(c)), and therefore Applicants are not required to furnish a copy of the application (as the PTO should have a copy of the application).

Regarding the rejections in (1) above, in the outstanding Office Action, independent claims 1 and 7 stand rejected on grounds of U.S. Patent No. 6,662,260 (Wertheim et al.) combined with U.S. Patent No. 6,467,003 (Doerenberg et al.). Applicants respectfully traverse.

Applicants read Wertheim as disclosing a system, where “blocks” can be connected to each other by multi-line switches. A block is, e.g., a memory bank or a computation unit. However, a single block in Wertheim does not include a plurality of functional units connected to each other through a sub-bus as recited in claims 1 and 7. For instance, claim 1 recites “wherein said functional units are divided into at least two sets so that the functional units of a single set are interfaced with a separate sub-bus of their own”, while original claim 7 recites “wherein, to increase a transfer capacity of the bus, it [the bus structure] comprises at least two sub-buses to each of which there is interfaced a set of said functional units, the bus structure further comprising a switching unit to unite said sub-buses into a more extensive bus”.

If one considers the bus segments 132, 134, 142, and 152 to be the “sub-buses” of Wertheim (which Applicants do not admit), there is only one “functional unit” connected to each sub-bus. No “set” (as recited in claims 1 and 7) of functional units can be found in Wertheim. For at least this reason, Applicants respectfully submit that the contention “...wherein said functional units are divided into at least two sets so that the functional units of a single set are inter-faced with a separate sub-bus of their own” in sections 4 and 12 in the outstanding Office Action as well as the contention “it (a bus structure) comprises at least two sub-buses to each of which there is interfaced a set of said functional units” in section 7 of the outstanding Office Action are not true. In fact, said matter indicates a large difference between the structures in question, their functions, and the subject matter in claims 1 and 7.

Applicants read Doerenberg, meanwhile, as disclosing a bus architecture, where “resource enclosures” may include a plurality of functional units (e.g., “modules”) and sub-buses. However, those resource enclosures (or “line replaceable units”, LRU) are not

connected to each other through a switching unit but through a backplane bus timed so that the system is fault tolerant.

The Examiner states in sections 4 and 7 of the outstanding Office Action that *“it would have been obvious to one of ordinary skill in the art -- to use the time division multiplexing of Doerenberg in the bus system of Wertheim, resulting in the invention of claim 1/claim 7”*. The Examiner does not relate how the systems of Doerenberg and Wertheim would be combined. Applicants respectfully submit that the combination of Doerenberg and Wertheim is improper and there is no motivation to combine these references. For instance, Doerenberg’s timing system lends itself to the structures comprising a bus with a plurality of units connected to it, and Wertheim’s system comprises no such bus. Instead, there are switches, by which any two units can be connected to each other. When two units have been connected, there is no need for any time division system. One might conceive that the blocks of Wertheim are extended so that each of the blocks includes a bus architecture of Doerenberg, but the result of course differs from the present invention as embodied in, e.g., claims 1 and 7.

On the above-mentioned grounds, amendments to claims 1 and 7 are not necessary. However, to clarify these claims, amendments have been made to claims 1 and 7. In an exemplary embodiment of a system herein, the switching unit (e.g., 330 in FIG. 3 and SWI + SCU in FIG. 7) attends to the timely uniting and separating of the sub-buses. For this purpose, the switch control unit SCU, being included in the switching unit, joins the control lines of the sub-buses. Consequently, such amendments are supported, e.g., from page 5, lines 1-8 and page 7, lines 9-13, in the description and from FIG. 3. In particular, the subject matter of “wherein at least checking, uniting, separating, and keeping are implemented by said switching unit” has been added to claim 1, while claim 7 has been amended as follows: “wherein, to increase a transfer capacity of the bus, the bus structure comprises at least two sub-buses with address, data, and control lines, to each of which sub-buses there is interfaced a set of said functional units, the bus structure further comprising a switching unit to unite said sub-buses into a more extensive bus and a power management unit to minimize energy

consumption of the bus structure, which switching unit comprises a switch control unit joining the control lines of the sub-buses" (emphasis added). Correspondingly, claim 9 is canceled. It is noted that in the system of Wertheim, the switching control comes through source-destination decoders without any interconnection to the bus segments. Thus, amended claims 1 and 7 further distinguish over Wertheim and a combination of Wertheim and Doerenberg. It is also noted that other minor amendments have been made to claims 1 and 7, and these amendments were also not made for purposes of patentability.

It is noted that because claims 1 and 7 are patentable over the combination of Wertheim and Doerenberg, dependent claims 3 and 4 are also patentable for at least the reasons given above. It is also noted that claim 9 has been canceled; therefore, rejections to this claim are moot.

With regard to the rejections in (2) above, as independent claim 1 is patentable over the combination of Wertheim and Doerenberg, dependent claim 5 is patentable for at least the reasons given above with respect to claim 1.

Regarding the rejections in (3) above, in sections 11 and 12 of the outstanding Office Action, independent claim 2 stands rejected on grounds of said Wertheim's publication combined with the publications U.S. Patent No. 5,630,145 (Chen) and U.S. Patent Application No. 2001/0003206 (Pole et al.). The invalidity of Wertheim ("wherein said functional units are divided into at least two sets...", etc.) as to the claims of disclosed invention was already presented before.

Regarding power saving, the Examiner alleges that "Chen teaches reducing the frequency on a bus when the bus activity drops below a certain level (Column 1, lines 27-36)". Applicants respectfully disagree for at least the following reasons:

- Firstly, in Chen's system, the frequency on a bus is not only reduced, but the sending of the clock signal is wholly stopped when the buses are idle (e.g., claim 1).

- Secondly, Chen tells nothing about “a certain level” as recited in claim 2 in the subject matter of “setting the supply voltage of a sub-bus to the lower one of said two levels if the data traffic rate of the sub-bus is smaller than *a certain value*”. In Chen, the clock signal is stopped for the time when the activity is zero and not, as recited in claim 2, below a certain level.

- Thirdly, lowering the frequency to reduce the power consumption is very well known, as such. Also, Chen presents this matter as prior art in the passage referred to by the Examiner. The Chen publication relates to the power saving in PCI bus system, which is a hierarchical system. The inventive idea in Chen is to secure that there is no data transfer going on in any PCI bus, when the clock signal is stopped. This idea has little or nothing to do with the present invention, as recited, e.g., in claim 2.

Pole discloses a method for changing the performance level of a computer system by changing the clock frequency and/or supply voltage of critical components. During a transition time, the computer is set in a low activity state so that the change would be implemented without malfunction. The primary idea in Pole is to make possible a higher performance level of a portable computer, when the portable computer is connected to an external power source.

The use of adjustable supply voltage for power lowering/raising is then mentioned in Pole's publication. However, it is an elementary thing and a matter-of-course that the power of a device lowers when its supply voltage is lowered. Nonetheless and by contraindication, in the present claim 2, there is brought out an exemplary method including the following:


- quantifying a mean data traffic rate for each sub-bus,
- setting the supply voltage of a sub-bus to the lower one of said two levels if the data traffic rate of the sub-bus is smaller than a certain value.

Neither Chen nor Pole (nor their combination) gives any suggestion about this kind of bus adapting principle, and especially quantifying a mean data traffic rate for each sub-bus. Therefore, claim 2 is patentable over Chen, Pole, or their combination. Because claim 2 is patentable, its dependent claim is patentable for at least the reasons given above with respect to claim 2.

Regarding the rejections in (4) and (5) above, as independent claim 7 is patentable, dependent claims 8 (see (4) above) and 10 and 11 (see (5) above) are patentable for at least the reasons given above.

Based on the foregoing arguments, it should be apparent that claims 1-8, 10, and 11 are thus allowable over the reference(s) cited by the Examiner, and the Examiner is respectfully requested to reconsider and remove the rejections. The Examiner is invited to call the undersigned attorney for any remaining issues.

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21 NOV. 06
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S.N. 10/735,052
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